Management Recommendations for

Kaernefeltia californica (Tuck.) Thell & Goward

[formerly *Cetraria californica* Tuck.]

version 2.0

CONTENTS

SUMMARY

Species: *Kaernefeltia californica* (Tuck.) Thell & Goward [formerly *Cetraria californica* Tuck.]
Taxonomic Group: Lichens (Oceanic-Influenced)
ROD Components: 1,3
Other Management Status: None

Range: *Kaernefeltia californica* is a hypermaritime lichen endemic to the west coast of North America, occurring in a narrow coastal band from southeastern Alaska south to central California. In the range of the Northwest Forest Plan, it is known from 42 sites: four in Washington, 27 in Oregon and 11 in California.

Specific Habitat: *Kaernefeltia californica* appears to be strictly coastal in most of its range. It is found in a narrow coastal band in conifer thickets, especially in the extensive Oregon dune sheet systems. *Kaernefeltiafeltia californica* grows on the bark, twigs, or cones of open grown conifers, especially bishop and shore pine, and on wooden fence posts and other wooden structures. Although it is found mostly at sea level or very low elevations, it has been reported from 1524 m (5000 ft) on the Hurricane Ridge Trail, Olympic National Park, and 40 miles inland near Selma, Oregon. These populations are probably *K. merrillii*, but need to be confirmed.

Threats: The major threat to *K. californica* is loss of populations resulting from activities that impact the population or its habitat, including altering the microclimate and removing colonized substrate. These activities would most likely be recreation-related, such as building trails and shelters, collecting firewood, and bicycle, off-road vehicle and foot traffic. The species is vulnerable to loss of habitat resulting from increasing building and clearing along the coast.

Management Recommendations:
- Manage known sites by maintaining ecological conditions associated with *K. californica*, including forest structure, substrate, and microclimatic conditions.
- Restrict building, burning, collecting specimens, collecting firewood, operating off-road vehicles and bicycles, and other recreational activities or development that could affect colonized substrates and harm known populations.

Information Needs:
- Verify the status of known populations and characterize the habitat.
- Determine if this species meets the criteria for close association with late-successional and old-growth forests.
- Check collections of *K. californica* and *K. merrillii* in the range of the Northwest Forest Plan to confirm identification of these often confused species.
- Locate additional populations of *K. californica* in potentially suitable habitat on federal land along the immediate coast in the range of the Northwest Forest Plan.

Management Recommendations for *Kaernefeltia californica*
[formerly *Cetraria californica*]

I. NATURAL HISTORY

A. Taxonomy and Nomenclature

Kaernefeltia californica (Tuck.) Thell & Goward (Thell and Goward 1996) was originally described as *Cetraria californica* Tuck. and was referred to by this name in the Forest Ecosystem Management Assessment Team report (USDA and USDI 1994a) and subsequent documents (USDA and USDI 1994b, 1994c).

Synonyms: *Cetraria californica*
Tuckermannopsis californica
Cornicularia californica
Coelocaulon californicum
C. cetrariza
Alectoria californica
A. cetrariza

B. Species Description

1. Morphology

This small (generally <2 (3) cm diameter) tufted, fruticose lichen is roundish to irregular in cross-section and varies from pale olive brown to olive black. Soredia and isidia are lacking but it has some short pointed branches, that may appear isidia-like (Figure 1). Apothecia are fairly common. This species is frequently confused with *Kaernefeltia merrillii* (formerly *Cetraria merrillii*) and *Nodobryoria abbreviata* (formerly *Bryoria abbreviata*), but is easily distinguished from these species in both habitat and form because neither of them are reported from oceanside forests (McCune and Geiser 1997; Thell and Goward 1996). *Kaernefeltia californica* is typically richly fertile, usually pale brownish, and has rather knobby branches often lightly covered with whitish pruina, while *K. merrillii* usually is sparsely fertile, has flatter, darker (greenish black) moderately smooth lobes lacking any trace of pruina (Thell and Goward 1996). Also, a sectioned epithecium of *K. californica* stains K+ purple and *K. merrillii* is K- (McCune, pers. comm.). *Nodobryoria abbreviata* is reddish brown and usually has terminal apothecia that are often marginally ciliate (McCune and Geiser 1997).

Technical Description: Thallus fruticose, up to 1.5 cm high, tufted or decumbent, gray or grayish- brown or pale to dark olive-brown, always paler in central parts; lobes rounded-angular to flattened in transverse section, to 1.0 (1.5) mm wide, frequently ridged and knobby, in part covered in whitish pruina; pseudocyphellae occasional, more or less distinct, immersed; cilia occasionally present, barely separate from smaller side lobes; isidia absent; rhizines absent;

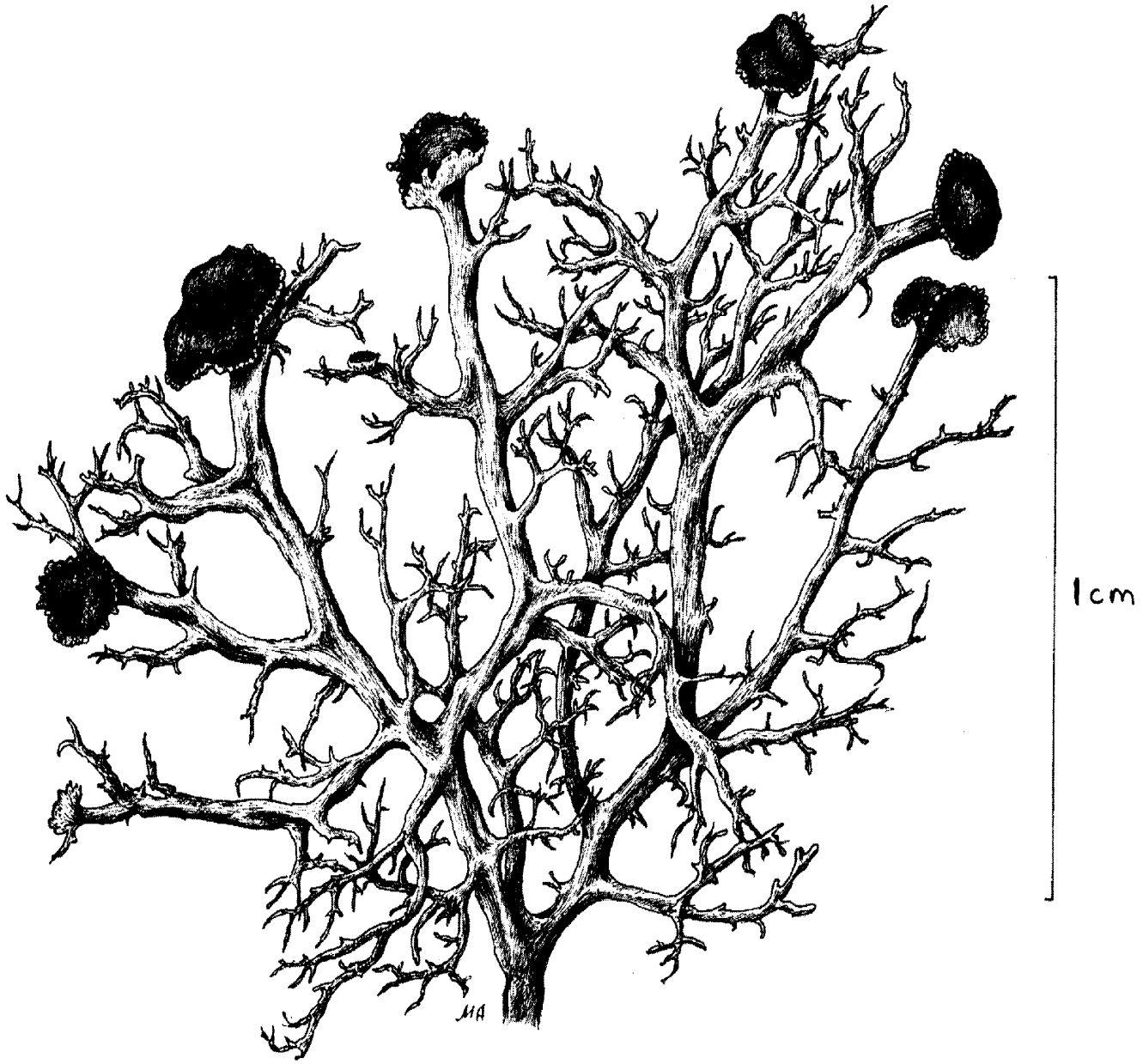

Figure 1. Line drawing of *Kaernefeltia californica* by Alexander Mikulin.

cortex usually 2-layered. Apothecia frequent, terminal, subterminal, or lateral, disc to 3 mm in diameter, dark brown or blackish, at first concave, later becoming convex. Photobiont is a green alga (Thell and Goward 1996).

2. Reproductive Biology

Kaernefeltia californica reproduces sexually by producing fungal spores in apothecia. True vegetative reproductive structures (i.e., soredia and isidia) are unknown, but given the brittle nature of the thallus and its tiny branches, this species may also reproduce through fragmentation.

3. Ecological Roles

This uncommon hypermaritime species is apparently confined to western North America at low elevations along the Pacific Ocean (Thell and Goward 1996), suggesting a narrow ecological amplitude. Specific ecological roles and interactions are unknown, although it occurs with other rare Survey and Manage lichen species.

C. Range and Known Sites

Kaernefeltia californica is an uncommon hypermaritime lichen endemic to the west coast of North America, occurring in a narrow coastal band from southeastern Alaska (Geiser *et al.* 1998) south to central California (Thell and Goward 1996). In the range of the Northwest Forest Plan, it is known from 42 sites: four in Washington, 27 in Oregon, and 11 in California. In Washington, it is known from Clallam and Grays Harbor counties; in Oregon, from Tillamook, Lane, Linn, Lincoln, Douglas, Josephine, Curry, and Coos counties; and in California from Humboldt and Mendocino counties.

In Washington, it is found in Olympic National Park, Westport Lighthouse State Park, and land near Grays Harbor of unknown ownership. In Oregon, it occurs near Lincoln City; near Cape Lookout and Cape Sebastian State Parks; in or near South Beach State Park; in the BLM Heceta Dunes Area of Critical Environmental Concern (ACEC), North Fork Hunters Creek ACEC, and New River ACEC; on the Siuslaw National Forest at Heceta Beach, Sutton Creek, Bluebird Campground, near North Bend, at Horsefall Dunes, Clear Lake; and at several sites in the Oregon Dunes National Recreation Area. Two inland collections near Cave Junction and Selma, Oregon, should be verified, as they may be *K. merrillii*. In California, *K. californica* occurs at Patrick's Point State Park, Lanphere Dunes Unit (Humboldt Bay National Wildlife Refuge, USFWS), on the Samoa Peninsula, and at several sites in the pygmy forest habitat near Mendocino. Only about 10 of these sites are on federally managed lands, mainly on the Siuslaw National Forest and Heceta Dunes BLM land. Most of these sites need to have land ownership determined or verified.

D. Habitat Characteristics and Species Abundance

K. californica occurs in the narrow coastal band in conifer thickets, especially in the extensive

Oregon dune sheet systems. It appears to be strictly coastal over most of its range (Thell and Goward 1996), mostly at sea level or very low elevations. *Kaernefeltia californica* tends to grow on bark, twigs, or cones, of open grown conifers especially bishop pine (*Pinus muricata*) and shore pine (*Pinus contorta*), and on wooden fence posts and other structures. Although it has been reported from 1524 m (5000 ft) on the Hurricane Ridge Trail, Olympic National Park, and at 365 m (1200 ft) about 40 miles inland on the Siskiyou National Forest near Selma, vouchers from these two inland sites should be reexamined to confirm they are not *Kaernefeltia merrillii*. *Kaernefeltia californica* is a Pacific Northwest endemic (Thell and Goward 1996). It can be locally abundant at some sites, although it is considered rare throughout its range (Thell and Goward 1996).

II. CURRENT SPECIES SITUATION

A. Why Species Is Listed Under Survey and Manage Standard and Guideline

Kaernefeltia californica was considered at risk under the Northwest Forest Plan because of its rarity and limited distribution within the range of the northern spotted owl. At the time of the FEMAT viability analysis, this species was known from 17 sites within the range of the northern spotted owl (USDA and USDI 1994a and b).

B. Major Habitat and Viability Considerations

The major viability consideration for *K. californica* is loss of populations resulting from management activities which impact the habitat or the populations.

C. Threats to the Species

Threats to *K. californica* are those actions that harm the populations or impact their habitat, including altering the microclimate and removing colonized substrate, which could result in the loss of individuals and populations. These would most likely be activities related to recreation such as building trails and shelters, collecting firewood, and off-trail bicycle, off-road vehicle and foot traffic. It is vulnerable to loss of habitat due to increasing construction and clearing along the coast.

D. Distribution Relative to Land Allocations

Many of the sites of *K. californica* need to have land ownership and land allocations verified. Several populations are in BLM Areas of Critical Environmental Concern and in the Oregon Dunes National Recreation Area, as well as Washington, Oregon and California State Parks.

III. MANAGEMENT GOAL AND OBJECTIVES

A. Management Goal for the Species

The goal for the management of *K. californica* is to assist in maintaining species viability.

B. Objectives

Manage known sites on federal lands by maintaining habitat, forest structure, occupied and potentially suitable substrate, and microclimatic conditions associated with *K. californica*, and by allowing existing habitat conditions to persist and evolve naturally.

IV. HABITAT MANAGEMENT

A. Lessons From History

No specific lessons from history about *K. californica* have been identified.

B. Identifying Habitat Areas for Management

All known sites of *K. californica* on federal land administered by the Forest Service or BLM in the range of the Northwest Forest Plan are identified as areas where these management recommendations should be implemented. A habitat area for management is defined as suitable habitat occupied by or adjacent to a known population.

C. Managing in Habitat Areas

The objective of management in habitat areas is to maintain suitable habitat for *K. californica.*

- Manage known sites by maintaining ecological conditions associated with *K. californica*, including forest structure, substrate, and microclimatic conditions.
- Collecting firewood should be restricted.
- Collecting of voucher specimens should be restricted unless they are found in litterfall.
- Restrict off-road vehicle and bicycle traffic in coastal ericaceous shrub habitats without trails.
- Minimize the extent of shrub and tree clearing along trails during maintenance activities.
- Develop practices to route human use away from the populations (*e.g.* , divert trails and roads). The trampling of shrubs, removing trees or branches, introducing non-native species by seed dispersal or planting, compacting of tree or shrub roots which support the species, are all examples of potential recreational impacts.

D. Other Management Issues and Considerations

Determine if *K. californica* meets the criteria for inclusion on the Survey and Manage species

list. For a species to be appropriately listed as a Survey and Manage species, it must first meet the criteria established for designation as a species closely associated with late-successional and old-growth forests (USDA and USDI 1994a [Table IV-6] and 1994b).

- Share information with state and private sectors to further activities directed at conservation of *K. californica*.
- Consider opportunities for managing known sites during Forest Plan or Resource Management Plan revisions, such as designating Botanical Special Interest Areas (BSIA), Areas of Critical Environmental Concern (ACEC), or other administratively withdrawn areas, or by prescribing special standards and guidelines.
- Request the Oregon and Washington State Natural Heritage Programs track and store information for *K. californica* across all land ownerships.

V. RESEARCH, INVENTORY, AND MONITORING NEEDS

The objective of this section is to identify opportunities to acquire additional information which could contribute to more effective species management. The content of this section has not been prioritized or reviewed as to how important the particular items are for species management. The inventory, research, and monitoring identified below are not required. These recommendations should be addressed by a regional coordinating body.

A. Data Gaps and Information Needs

- Reexamine inland collections of *K. californica* in the range of the Northwest Forest Plan to confirm identifications
- Determine if *K. californica* is closely associated with late-successional and old-growth forests following the criteria established in FEMAT ([Table IV-6], USDA and USDI 1994a).
- Determine distribution of *K. californica* in areas identified as potentially suitable habitat. There are several other federally managed parcels of coastal fog zone habitat with populations of other rare oceanic lichens with similar habitat requirements. They are Gwynn Creek, Sand Lake, and Eel Creek (Siuslaw National Forest, Oregon Dunes National Recreation Area), BLM Heceta Dunes ACEC; a small BLM parcel near Cape Lookout State Park; and other coastal BLM parcels.
- Identify which areas provide the most optimal *K. californica* habitat, as suggested by an abundance of the species.

B. Research Questions

- What are the dispersal rates and mechanisms of *K. californica*?
- Which habitat characteristics and ecological conditions are necessary for survival of *K. californica* propagules?
- What limits dispersal and establishment of propagules and colonization of suitable *K. californica* habitat?

- Is *K. californica* sensitive to air pollution?
- Which other rare lichens occur with *K. californica*?
- Do refugial populations disperse into managed stands?

C. Monitoring Needs and Recommendations

No monitoring needs are identified at this time.

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